Studio Display DVI (15" flat panel, Graphite)

Basics

Studio Display DVI

Overview

In December 1999, the DVI version of the Studio Display (15" flat panel) was introduced. It offers

- Digital Visual Interface (DVI) 24-pin connector
- translucent graphite and white housing colors
- two USB ports
- one display cable that branches into a DVI, a USB, and a power adapter connector
- power button and brightness controls

Features Comparison

Although the design of the Studio Display DVI is similar to the previous two 15" flat-panel versions, this latest version offers a digital interface and other significant changes. Following is a quick reference table that compares features among the three versions.

Features	DVI	Rev. B	Rev. A (Original)
Housing color	Graphite	Blue and white	Azul
Introduction date	December, 1999	January, 1999	May, 1998
Number on back of display	M7613	M4551	M4551
Number on data sheet	M7612/A	M6356/A	M6356/A
Video interface	DVI digital	RGB analog	RGB analog

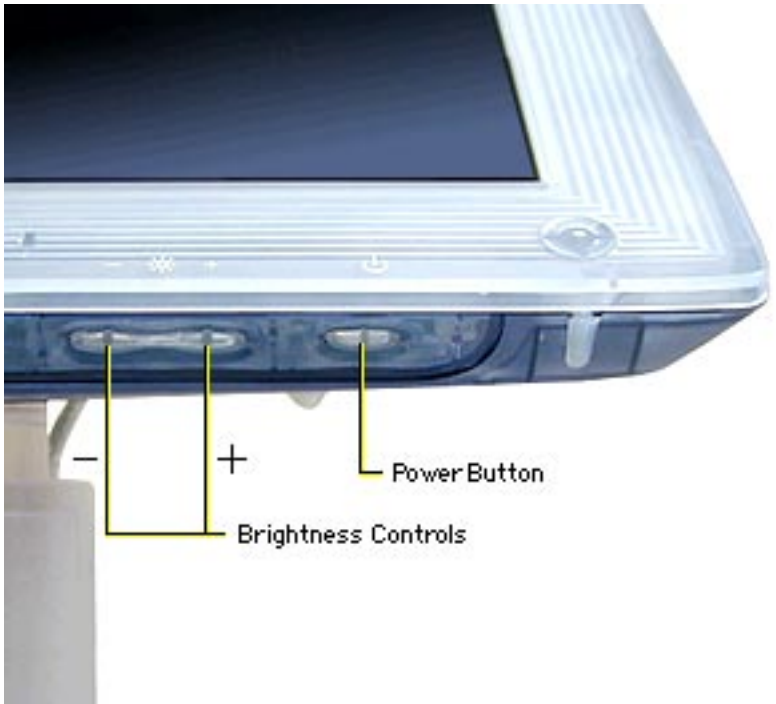
Features	DVI	Rev. B	Rev. A (Original)
Video cable connector	DVI	VGA	VGA
Monitor control	USB	ADB and OSD	ADB and OSD
Communications bus	USB with two downstream ports	ADB	ADB
Front panel user controls	brightness, power	reset, OSD on/off, OSD navigation, OSD adjustment, video source, brightness, power	reset, OSD on/off, OSD navigation, OSD adjustment, video source, brightness, power
Rear ports	two USB ports	audio out, audio in left, audio in right, C video in, S video in	audio out, audio in left, audio in right, C video in, S video in
Color depth	8 bit/color, 24 bit	8 bit/color, 24 bit	8 bit/color, 24 bit

Features	DVI	Rev. B	Rev. A (Original)
Power management	NuTMDS power	DPMS	DPMS
Video support	not supported	NTSC, PAL, SECAM	NTSC, PAL, SECAM
Resolutions scaling	ATI ratiometric	Genesis GMZ1	Genesis GMZ1
Native resolution	1024 x 768	1024 x 768	1024 x 768
System requirements	AGP-based Power Mac G4 systems running Mac OS 9.0 or later	• Power Macintosh or other Mac OS-based systems with PowerPC processors running Mac OS 8.0 or later • Windows 95- and Windows NT-based systems	• Power Macintosh or other Mac OS-based systems with PowerPC processors running Mac OS 7.5 or later • Windows 95- and Windows NT-based systems

Front View

From the front (underside) of the display you can access the user controls:

- power button
- brightness

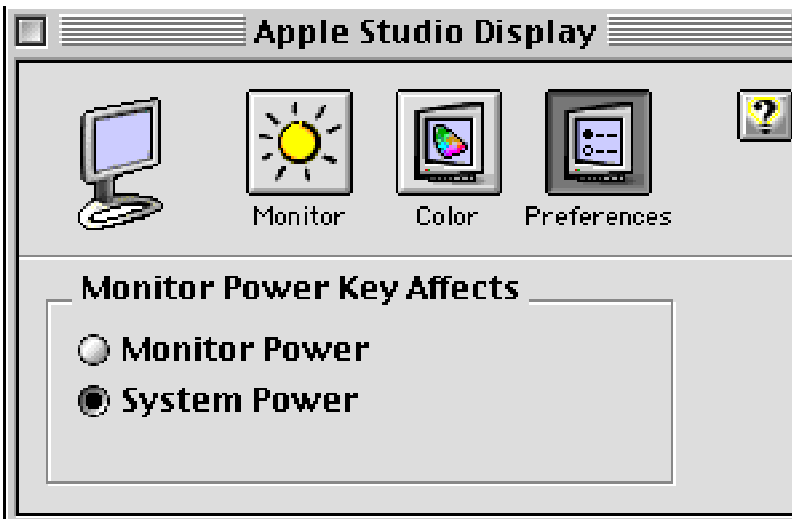


User Controls

The user controls are a power button and two brightness controls.

The power button is preset to turn on both the display and the computer at the same time (or put the system in sleep mode).

You can change the power button setting so that pressing the monitor's power button affects the monitor only.



Power Button Setting

To change the setting, open the Monitors control panel and click the Preferences button, as shown at left:

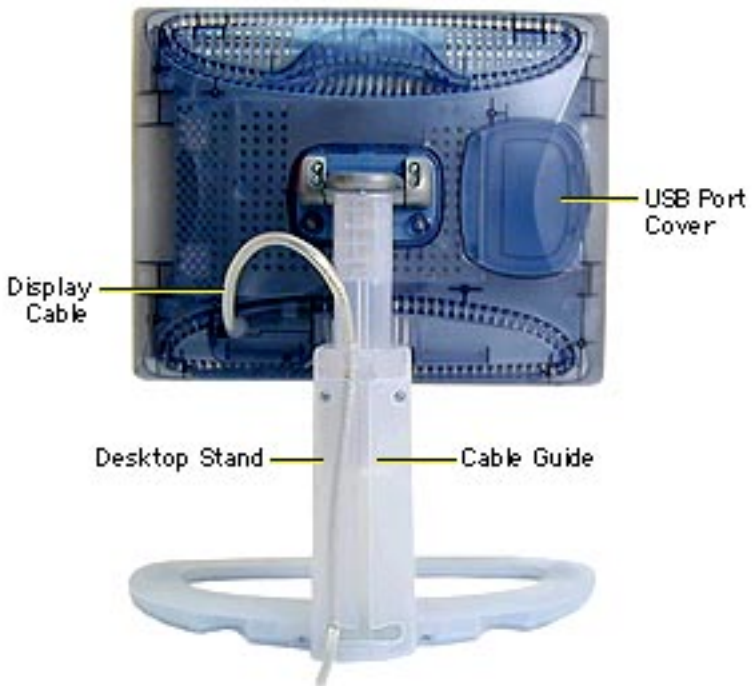
- Monitor Power affects the monitor only (not the computer)
- System Power is the default setting that affects both the monitor and the computer

Note: With version 1.8.1 (and later) of the Apple Displays Software, the Monitors & Sound control

panel became two separate control panels: “Monitors” and “Sound.”

Brightness Slider Control

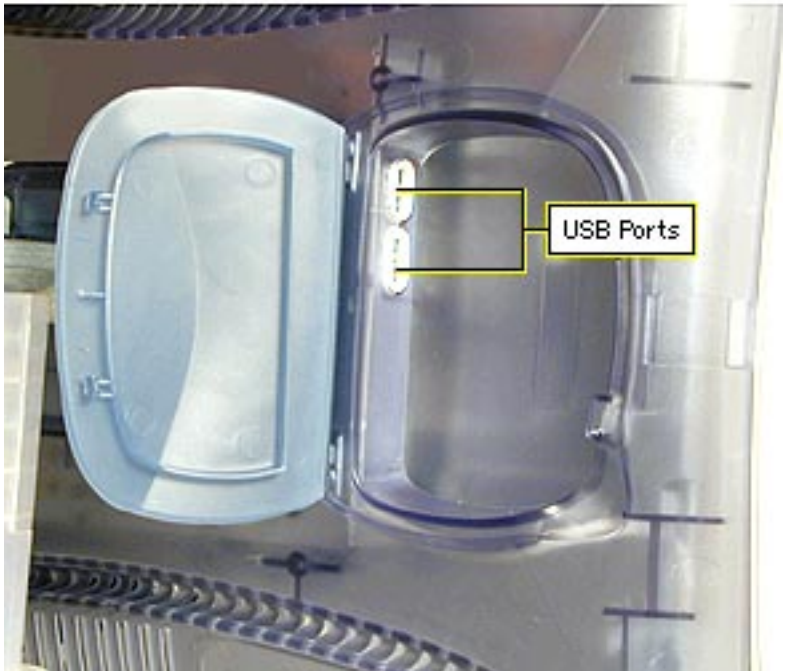
Pressing the brightness controls, on the underside of the display, brings up an on-screen brightness slider control. As you press the brightness controls, the slider control moves and the screen brightness adjusts.



Back View

From the back of the monitor you can see the

- USB port cover
- desktop stand and cable guide
- display cable



USB Ports

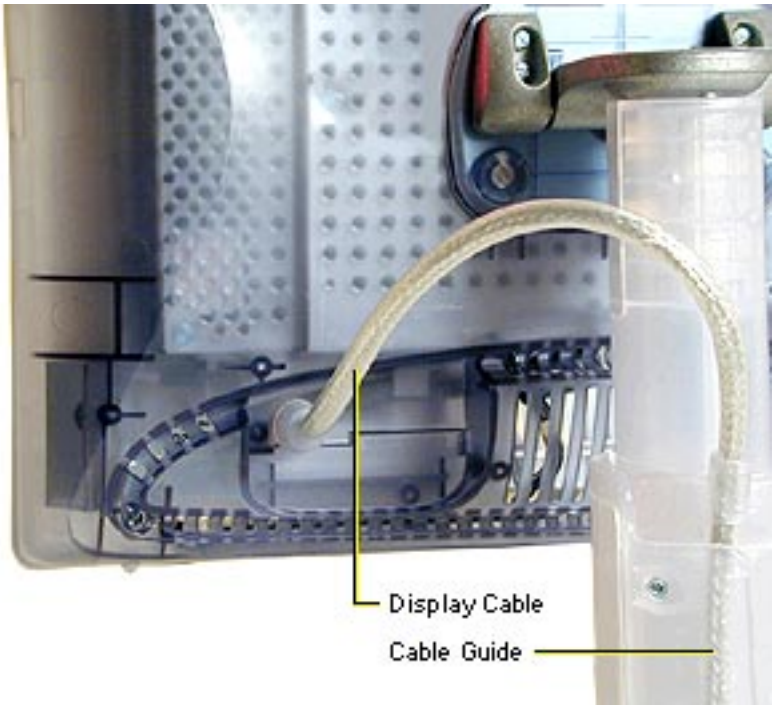
Behind the USB port cover are two USB ports. They support USB input devices such as a keyboard, mouse, or trackball.

Monitor Stand

The display can be used with either stand:

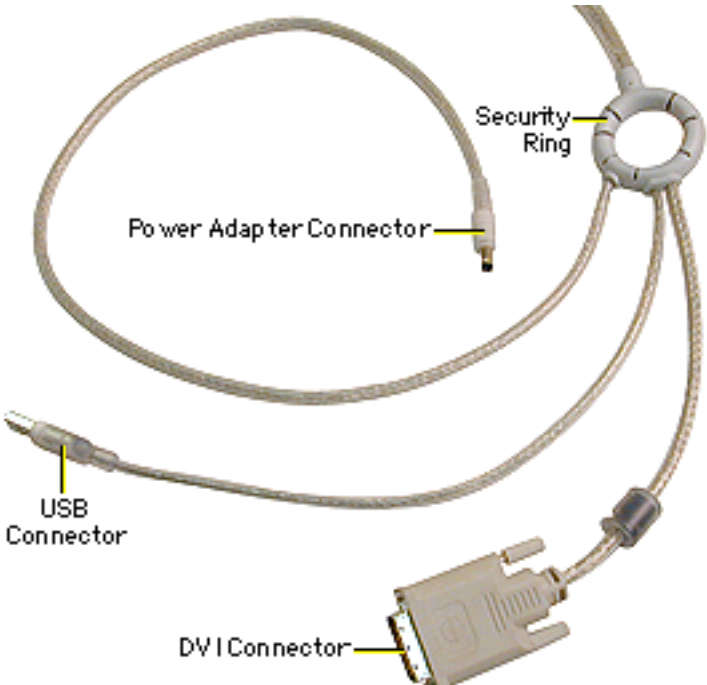
- desktop stand allows a wide range of tilt, swivel, and height adjustment
- flip-out stand allows a fixed, table-top position optimal for single-user viewing

Important: The housing parts (desktop stand, flip-out stand, and USB port cover) should be exchanged like for like.



Display Cable

From the back of the monitor the display cable routes through the cable guide on the desktop stand.



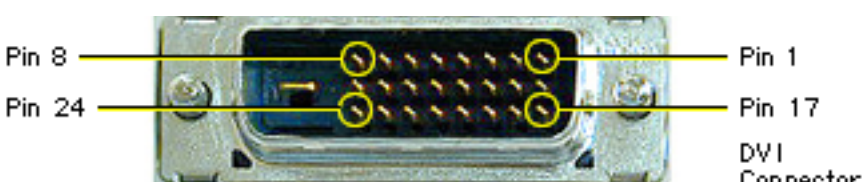
The other end of the display cable branches into a security ring with three cables to these connectors:

- DVI connector
- USB connector
- power adapter connector

New Technology: DVI

The Studio Display DVI is one of the first Apple displays to support Digital Visual Interface (DVI).

DVI is a technology developed by a consortium of companies that enables a system to store and display moving video images. A DVI connector is more advanced than a standard VGA connector. With DVI, all content transferred over this interface remains well preserved from start to finish for high-quality digital images. Following shows the DVI connector pins:



U.S. Repair Strategy

The Studio Display DVI is serviced through the service facilitation process. Customers may choose carry-in repair service through an Apple-authorized service provider (AASP) who will then facilitate a mail-in repair or customers can receive mail-in service from Apple directly.

Ordering

Apple-authorized service providers planning to support the Studio Display DVI may facilitate service by calling 800-919-2775 and selecting option 6.

For more details on this facilitation process, please refer to the Facilitation Process in the archived service notices section of the Service Source CD. (Open the Notices Archive folder at the top level of the Main CD. The complete path is

Notices Archive: Service Notices Archive: Service Source Startup: Service Information: Notices: Service Notices: Archived List: Facilitation Process.)

Parts

To order replacement parts, use the AppleOrder system and refer to Studio Display DVI (15" Flat Panel, Graphite) in the Service Price Pages. Large businesses, universities, and K-12 accounts must provide a purchase order for all transactions, including orders placed through the AppleOrder system.

Service providers not enrolled in AppleOrder may fax their orders to Service Provider Support (512-908-8125) or mail them to the following address:

Apple Computer, Inc.
Service Provider Support
Mail Stop 212-SPS
2323 Ridgepoint Drive
Austin, TX 78754

If you have further questions, please call Service Provider Support at 800-919-2775 and select option 1.

Warranty and AppleCare

The Studio Display DVI is covered under the Apple One-Year Limited Warranty. The AppleCare Service Plan is also available for this product. Service Providers are reimbursed for warranty and AppleCare repairs facilitated for this display. For pricing information, refer to the Service Price Pages.

Canada Repair Strategy

The service strategy for the Studio Display DVI is whole-unit replacement in Canada. To prevent “no fault found” returns on the unit, please use the following procedure when you require a service repair:

1 Troubleshoot the unit to ensure the problem isn't with the software or with the computer.

2 After confirming the issue is with the display, call Technical Service Provider Support (TSPS) at 800-217-9517 (have your 10-digit service account number, beginning with 61, ready). Be prepared to explain the issue, your troubleshooting steps, and the display's serial number to the TSPS phone agent.

3 After verifying the troubleshooting you've performed, the TSPS phone agent will authorize the repair by giving

you the whole-unit service replacement part number, and a Vantive case number.

4 Use AppleOrder to place the order for the whole-unit service replacement by manually populating the Part Number field with the part number given to you by the TSPS. Then mark the order for review, and put the Vantive case number in the Comments field. Failure to do so will result in your order being declined.

5 When you receive the whole-unit service replacement, return the old display as you would any other service module.

Specifications

Studio Display DVI

Introduction

Specifications information for the Studio Display DVI can be found in the Spec Database, which you can access from the Service Source CD in one of three ways:

- Launch it directly by double-clicking the Apple Spec Database runtime alias at the top level of the Main Service Source CD.
- Select Apple Spec Database from the Service Source drop-down main menu.
- Click the Acrobat toolbar icon for the database, which is near the right end of the toolbar with the letters “SP.”

To access product specifications on the Web, click Apple Spec on the Troubleshoot and Repair page.

Apple Studio Display

Features

Spectacular all-digital display

- 15-inch (diagonal) thin film transistor (TFT) active-matrix liquid crystal display delivers bright, sharp text and graphics
- Native resolution of 1024 by 768 pixels allows for comfortable viewing, day in and day out
- Designed to work with the Power Mac G4 digital graphics interface for distortion-free images
- Lightning-fast pixel response supports full-motion digital video playback
- Offers the convenience of a wide viewing angle—up to 120°
- Supports a true 16.7 million colors for use in all graphics-intensive applications

Flexible, elegant design

- Takes up a fraction of the space required by a traditional display
- Includes tilt-and-swivel and height adjustments for optimal viewing comfort
- Offers an alternate picture-frame stand that can further minimize its desktop footprint
- Includes a two-port, self-powered USB hub for easy connection of peripherals
- Provides a convenient power/instant-on switch controlling both the display and the Power Mac G4
- Complies with strict TCO 95 standards for low power consumption, low emissions, and recyclability

The Apple Studio Display is an elegantly designed flat-panel display that incorporates a high-performance, pure digital graphics interface to produce brilliant graphics, crisp text, and lifelike video. Combined with the powerful Apple Power Mac G4 computer, the Apple Studio Display is an ideal solution for busy creative professionals.

The display is perfectly matched to the ATI RAGE 128 Pro graphics card in the new Power Mac G4, which delivers an industry-standard digital graphics signal. You see 1024 by 768 razor-sharp pixels displayed absolutely distortion free. And you never need to adjust the display to get a perfect view.

The TFT active-matrix LCD technology used by the Apple Studio Display enables it to offer outstanding brightness, contrast ratio, and sharpness for optimal viewing. It also provides an impressively wide viewing angle, as well as a rock-solid image completely free from screen flicker. Supporting a true 16.7 million colors, the Apple Studio Display outshines competitive monitors in graphics-intensive applications. And it offers all of this performance in a product that's a fraction the size of a traditional computer monitor.

Its built-in USB hub provides easy connections to your keyboard and other desktop peripherals. The Apple Studio Display also offers the convenience of a power/instant-on switch to start up both the display and the Power Mac G4 together. You can use the same button to quickly put the entire system to sleep or wake it up.

Creative professionals, particularly those involved in design and publishing, video, and scientific and technical work, will appreciate its compact, flexible, and elegant design. And everyone enjoys looking at the Apple Studio Display—front, back, and sideways. Thin, light, and spectacularly stylish, this display is as beautiful in appearance as it is in performance.

The Apple Studio Display—brilliant, graceful, and digital all the way.

Ordering Information

Apple Studio Display
Order No. M7612LL/A

- Apple Displays software
- Power cord and adapter
- Picture-frame stand
- User's manual

For More Information

For more information about this product, or to find out where to buy Apple products, visit www.apple.com/products on the World Wide Web or call 800-538-9696. To purchase this product from the Apple Store, go to www.apple.com/store.

Safeguard your display for three full years with the AppleCare Protection Plan. You'll benefit from a host of services, including powerful diagnostic software tools, online support, regular e-mail updates, and Apple's toll-free helpline. And for most problems, no problem: We'll fix your hardware for the next three years. You have the assurance of being helped by Apple certified technicians using genuine Apple parts—and the reassurance of knowing that your display is covered. For more information, visit www.apple.com/support.

Technical Specifications

Screen size and type
- 15 inches (diagonal viewable image size)
- Thin film transistor (TFT) active-matrix liquid crystal display

Display colors (maximum)
- 16.7 million

Viewing angle (typical)
- 120° horizontal; 90° vertical

Brightness (typical)
- 200 cd/m^2

Contrast ratio (typical)
- 200:1

Resolutions
- 1024 by 768 pixels*
- 832 by 624 pixels
- 800 by 600 pixels
- 640 by 480 pixels

*Optimum resolution.

User controls (hardware and software)
- System startup/sleep, power on/off
- Brightness

Screen treatment
- Antiglare hardcoat

Connectors and cables
- Digital Visual Interface (DVI) 24-pin connector with Transition Minimized Differential Signaling (TMDS)
- Two-port, self-powered USB hub
- DC connector for DC input

Power supply electrical requirements
- Line voltage: 100V to 240V AC
- Frequency: 50 to 60 Hz, single phase
- Power: less than 35W (operating)

Agency approvals
- FCC Part 15 Class B
- CISPR 22 Class A (EN500821f)—complies with European EMC directive
- DOC Class B
- VCCI Class 2
- CE Mark
- EPA ENERGY STAR compliant
- IEC 950
- EN60950
- NUTEK
- TCO 95
- MPR II

Environmental requirements
- Operating temperature: 50° to 95° F (10° to 35° C)
- Storage temperature: –20° to 140° F (–20° to 60° C)
- Operating humidity: 5% to 95%, noncondensing
- Operating altitude: 0 to 10,000 feet (0 to 3,048 m)

Size and weight
- With desktop stand: 15.0 inches (minimum) to 19.3 inches (maximum) by 15.7 inches by 9.8 inches (38.1 to 49.0 cm by 39.9 cm by 24.9 cm)
- With picture-frame stand: 11.6 by 15.7 by 6.9 inches (24.9 by 39.9 by 17.5 cm)
- With desktop stand: 12 pounds (5.5 kg)
- With picture-frame stand: 7.7 pounds (3.5 kg)

System requirements
- Power Mac G4 computer with ATI RAGE 128 Pro graphics card and built-in USB

Nothing works and looks better with a new Power Mac G4 computer than an Apple Studio Display (sold separately).

Apple Computer, Inc.

1 Infinite Loop
Cupertino, CA 95014
408-996-1010
www.apple.com

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December 1999 L04975A

Troubleshooting

Studio Display DVI

General

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to your product. Because cures are listed on the charts in the order of most likely solution, try the first cure first. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure.

For additional assistance, contact Apple Technical Support.

For general troubleshooting tips, go to the Adjustments chapter and open the linked user's manual.

First Checklist

Important: Many displays returned for repair are found to be fully operational. Read this checklist to prevent needless module replacement and unnecessary time delays.

The Studio Display DVI is not compatible with all computers.

This display works with selected AGP-based Power Mac G4 computers.

Verify connections.

Symptoms that mimic display failures can be caused by loose cable connections or a loose DVI graphics card in the computer. Check cable connections and verify there are no bent pins. Ensure that the DVI graphics card is securely connected in the computer.

Protect the display from static discharge.

To prevent possible damage to the display from electro-static discharge, always plug in the computer to a grounded power outlet before connecting the Studio Display DVI to the computer.

Shut down the display or put it to sleep when it will not be used for an extended period.

A constant and unchanging image that is left on an LCD screen for an extended period of time (approx. 24 hours) can leave a residual ghost image. To remove the image, either shut down the display or put it into sleep mode using the Energy Saver control panel. The time it takes to recover depends on how long the original image was left on the screen. It generally takes between one and two times as long to remove the ghost image as it took to create it.

With the display in sleep mode using Energy Saver, the power light is amber and the backlights are off. Although a screen saver can be used, some screen savers keep the display backlights in use, thereby decreasing the useful life of the backlights.

Symptom Charts

No Image

No image (screen is black)	1 Adjust front panel brightness (it may be set too low). 2 Shut down the computer and monitor. Disconnect monitor cables. Check cables for bent pins. Reconnect monitor cables and restart computer and monitor. 3 If screen brightness has decreased over time, the most likely condition is the backlights failing. If you suspect backlight failure, contact Apple Technical Support. 4 Replace the DVI graphics card in the computer. 5 In the US, call Apple Technical Support at 800-919-2775. In Canada, call 800-217-9517.

Screen Resolutions

Blurry or wavy screen image at different resolutions

1. Use one of the resolutions that are listed as Recommended in the Monitors control panel. **Note:** Some resolutions from the Show All list can produce less than optimal results (fuzziness, black bars on sides or top and bottom of display area).
2. For best results, set screen resolution to 1024 x 768 using the control strip or the Monitors control panel. 1024 x 768 is the native resolution for the Studio Display DVI.

Screen Color

Screen colors are not correct	1 Allow the display to warm up for 30 minutes. 2 Check color accuracy by using a familiar desktop pattern or a solid color test pattern. Open the Monitors control panel, click Color, and verify that a suitable ColorSync Profile is selected. Click Calibrate in the Color menu to change the color calibration. 3 Open the Monitors control panel and check that Color Depth is not set to Grays.
Color intensity varies; large patch of color not uniform	For best results, allow the display to warm up for 30 minutes to reach peak color quality. When displaying a large area of a single color, the color might not appear uniform throughout the area. This symptom can occur if the display has not warmed up.

Screen Brightness

Screen image dim	1 Adjust front panel brightness (it may be set too low). 2 Open the Monitors control panel and click Calibrate in the Color menu to change the color calibration. 3 From the Monitors control panel, click Calibrate in the Color menu and try changing the color calibration settings. 4 If screen brightness has decreased over time, the most likely condition is the backlights failing. If you suspect backlight failure, contact Apple Technical Support.

Focus

Screen image blurry

1 Using the Monitors control panel or the control strip, set screen resolution to 1024 x 768.

Note: 1024 x 768 is the native resolution for the Studio Display DVI. Although you can “magnify” the screen image to enlarge fonts and graphics by selecting other screen resolutions, LCD flat-panel displays cannot change their scan rates like a CRT can, so some blurriness is expected when using non-native resolutions.

2 Open the Appearance control panel and select Fonts. Deselect the checkbox for “Smooth all fonts on screen.”

Error Messages

Error message reads "This monitor is not supported by this version of the Apple Displays Software"	1 Ensure that computer is compatible. Verify that DVI graphics card is secured correctly. (Refer to "First Checklist" at the beginning of this chapter.) 2 Install Apple Displays Software that came with the Studio Display DVI. For installation instructions, refer to the linked user's manual in the Adjustments chapter.
Error message reads "This version of the system software is not supported by the Apple Displays Software"	If this message occurs in the Apple Displays Software installer, check that you selected the startup hard disk in the Installation dialog box.

Error Lights

Power light flashes amber in repeating sequence of three short flashes	1 Ensure correct graphics card installed. 2 Install Apple Displays Software that came with the Studio Display DVI. For installation instructions, refer to the linked user's manual in the Adjustments chapter.
Power light flashes amber in repeating sequence of two short flashes and one long flash	This symptom indicates a problem with the backlights. In the US, call Apple Technical Support at 800-919-2775. In Canada, call 800-217-9517.

Miscellaneous

Screen freezes	This symptom occurs when Energy Saver conflicts with a screen saver program. Turn off either the screen saver program or Energy Saver, and restart the computer.
Computer shuts down or sleeps when monitor power button is pressed	The display's power button is preset to shut down or put to sleep both the display and the computer. To change the power button setting so it affects the display only, open the Monitors control panel and go to the power button setting in Preferences. Click the Monitor Power button.
Change made in Monitors control panel does not affect screen image	1 If you have more than one display connected to the computer, ensure that the control panel shows the correct display name in the title bar. 2 Disconnect all peripheral USB devices except the display, the Apple keyboard, and the mouse. 3 Install Apple Displays Software that came with the Studio

	Display DVI. For installation instructions, refer to the linked user's manual in the Adjustments chapter.
No on-screen display when brightness button pressed; or no power mode options in Monitors control panel	1 Ensure display's USB cable connector is plugged into computer's USB port. 2 Install Apple Displays Software that came with the Studio Display DVI. For installation instructions, refer to the linked user's manual in the Adjustments chapter. 3 Restart computer.
Preferences button missing from Monitors control panel	Ensure display's USB cable connector is plugged into computer's USB port. Reinstall system software.

Residual image still visible after the screen image changes

Allowing a constant and unchanging image to remain on the display screen for a long period of time can leave a faintly visible residual image when the screen finally changes. This is a temporary symptom that does not affect the functionality of the display. To remove the image, either shut down the display or put it to sleep using the Energy Saver control panel. The time it takes to recover depends on how long the original image was left on the screen. It generally takes between one and two times as long to remove the ghost image as it took to create it.

To prevent the symptom, recommend that the customer use the Energy Saver control panel to put the screen to sleep (darkening the display face) when it is not in use. With the display in sleep mode using Energy Saver, the power light is amber and the backlights are off. Although a screen saver can be used, some screen savers keep the display backlights in use, thereby decreasing the useful life of the backlights.

Take Apart

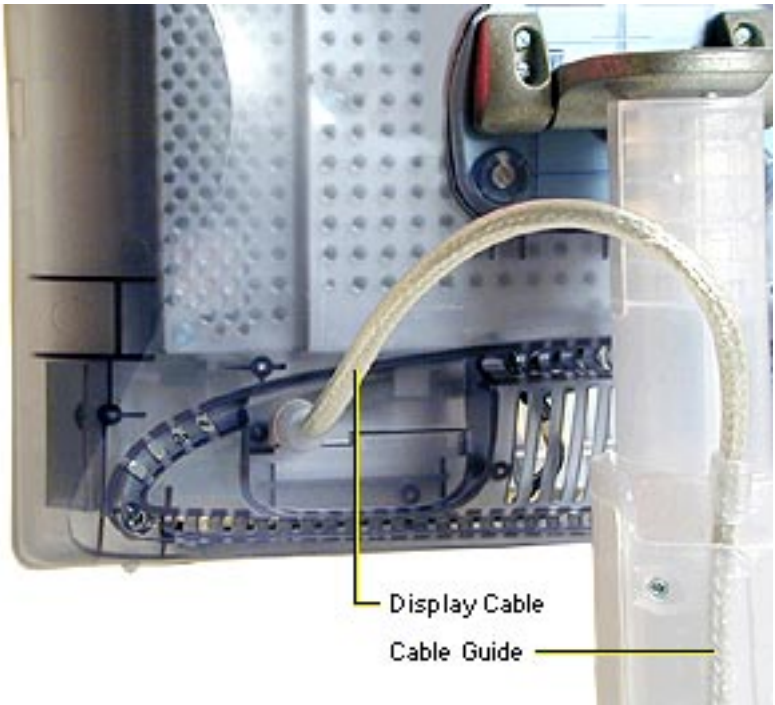
Studio Display DVI

Safety Guidelines

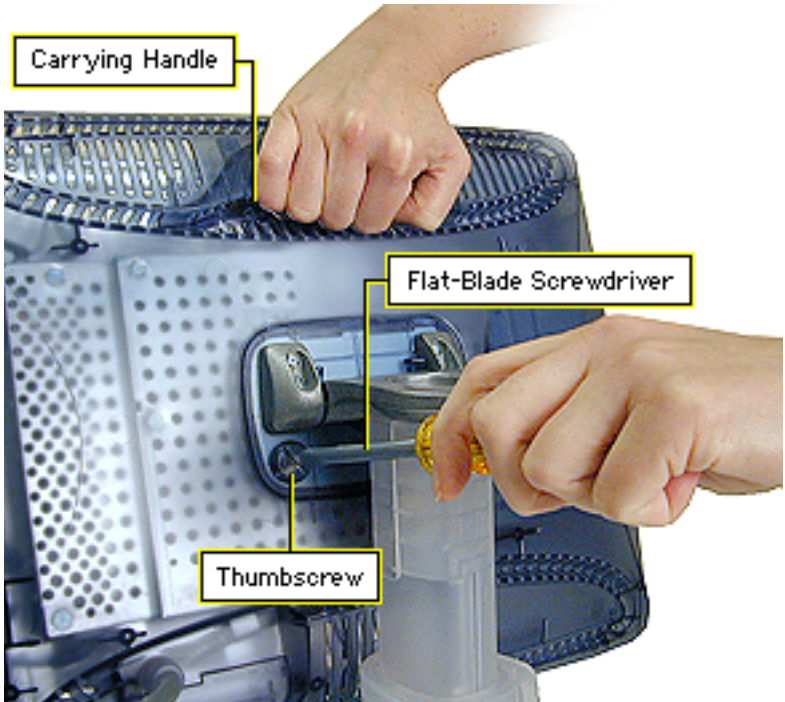
⚠**Warning:** Before handling the Studio Display DVI, ensure that you have a clean, flat work surface. Protect the display face from scratches or nicks by covering it with a protective film or a clean, lint-free cloth. Remove all jewelry that could scratch or damage the display or plastic housing.

Desktop Stand

Important: Before you begin, ensure that you have a clean, flat surface to work on. Protect the display face from scratches or nicks by covering it with a protective film or a clean, lint-free cloth.



1. Adjust the neck of the desktop stand to its highest extended position.
2. Remove the display cable from the cable guide on the desktop stand.
3. Tilt the display so the bottom of the rear housing touches the desktop stand.



4 While supporting the display at the carrying handle, use a flat-blade screwdriver to loosen, but not remove, the two thumbscrews and thin plastic washers at the rear of the display.

Note: Leave the thumbscrews and washers attached to the desktop stand.

5 While supporting the display, tilt up the bottom of the display, and raise it off the three metal tabs on the stand.

6 Place the display on a clean, flat surface.

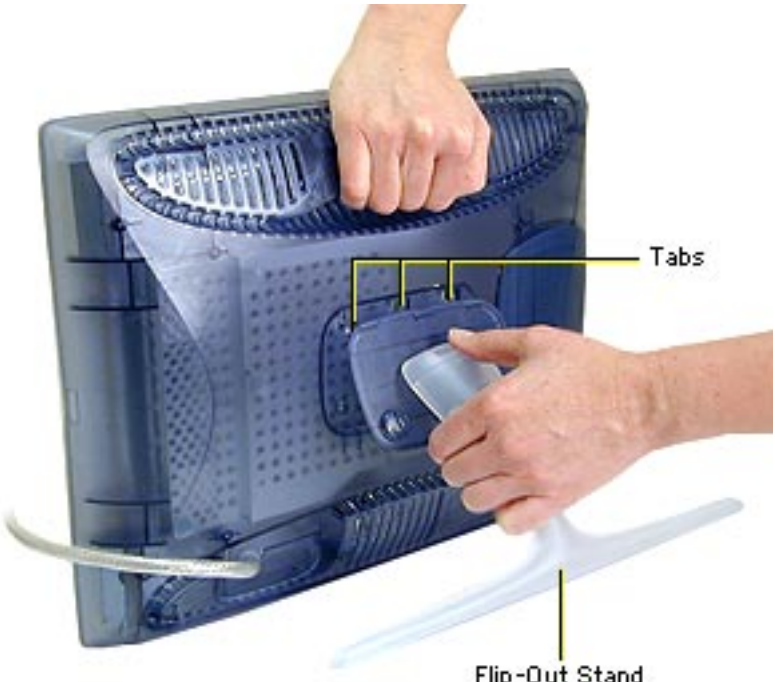
Flip-Out Stand

Important: Before you begin, ensure that you have a clean, flat surface to work on. Protect the display face from scratches or nicks by covering it with a protective film or a clean, lint-free cloth.

1 Support the display at the carrying handle.

2 Using a flat-blade screwdriver, loosen but do not remove the two thumbscrews and thin plastic washers at the rear of the display.

Note: Leave the thumbscrews and washers attached to the flip-out stand.



3 While supporting the display, tilt the flip-out stand down and away from the display to release the three tabs from the rear housing.

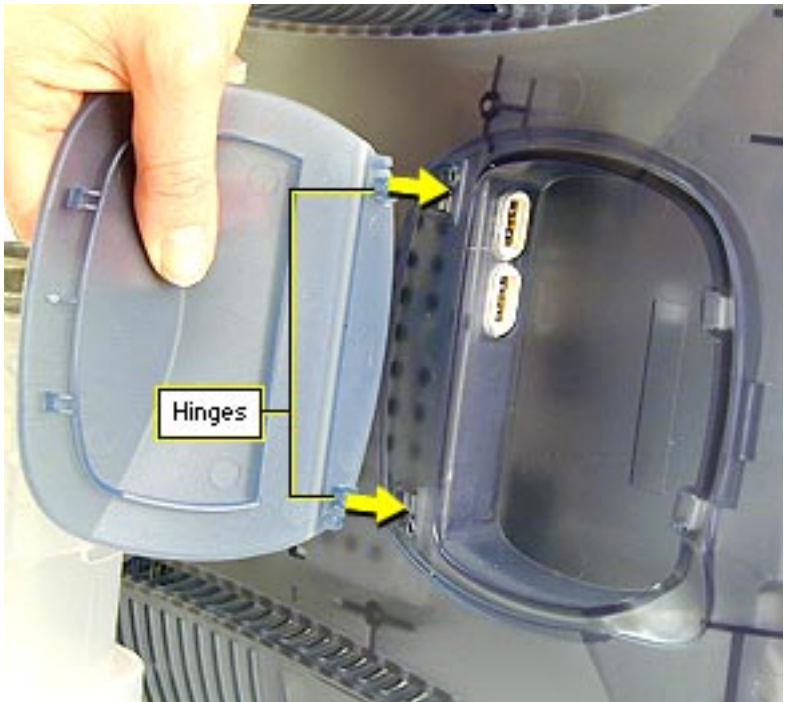
4 Place the display on a clean, flat surface.

USB Port Cover

Before you begin, position the display with the USB port cover facing you.

1 Open the USB port cover.

2 Pull the USB port cover away from the rear housing.



Replacement Note: Align the two hinges on the USB port cover to the two small openings on the rear housing. Press the USB port cover into place.

Adjustments

Studio Display DVI

Linked User's Manual

You can adjust the screen brightness using the brightness buttons on the front of the Studio Display DVI or you can use the Monitors control panel.

Note: With version 1.8.1 (and later) of the Apple Displays Software, the Monitors & Sound control panel became two separate control panels: "Monitors" and "Sound."

Refer to "About Your Apple Displays Software" in the linked Studio Display user's manual. This page describes the basic picture and color settings that can be adjusted using control panels, the Control Strip, Digital Color Meter, and Mac Help.

Click the icon at left to open the user's manual.

Exploded View

Studio Display DVI

Exploded View of Studio Display DVI (15" flat panel, Graphite)